

I CLAIM:

1. A cleaning apparatus, comprising:

a housing;

a supply reel secured within the housing;

a take-up reel secured within the housing;

a cleaning ribbon extending from the supply reel to the take-up reel; and

a rotatable brush secured within the housing,

wherein a particle trap is formed by a configuration of the cleaning ribbon, and the rotatable brush is disposed on a forward side of the particle trap, and sweeps debris into the particle trap upon rotation of the rotatable brush.

2. A cleaning apparatus according to claim 1, further comprising a handle attached to the housing for manually moving the apparatus along a surface to be cleaned.

3. A cleaning apparatus, comprising:

a housing; and

a cartridge detachably secured within the housing, the cartridge including:

a supply reel;

a take-up reel;

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a cleaning ribbon extending from the supply reel to the take-up reel and having a cleaning surface substantially parallel to a surface to be cleaned; and

a rotatable brush disposed on a forward side of the cleaning surface,

wherein a particle trap is formed by a configuration of the cleaning ribbon, and the rotatable brush sweeps particles into the particle trap upon rotation of the rotatable brush.

4. A cleaning apparatus according to claim 3, wherein the housing includes a panel that is removable for providing access to the cartridge.
5. A cleaning apparatus according to claim 3, wherein the cleaning ribbon is comprised of an electret material that electrostatically attracts and retains debris.
6. A cleaning apparatus according to claim 3, wherein the cleaning ribbon is comprised of an adhesive material.
7. A cleaning apparatus according to claim 3, wherein the cleaning ribbon is saturated with a cleaning agent.
8. A cleaning apparatus according to claim 3, wherein the cleaning ribbon is a textured cloth.
9. A cleaning apparatus according to claim 3, wherein the cleaning ribbon comprises a combination of at least two of an electret material, an adhesive material, a material saturated with a cleaning agent, and a textured cloth.
10. A cleaning apparatus according to claim 3, wherein the cleaning ribbon is wound on the supply reel in such a way that the width of the supply reel is reduced.
11. A cleaning apparatus according to claim 10, wherein the width of the supply reel is reduced by folding the cleaning ribbon at least once in a lengthwise direction.

12. A cleaning apparatus according to claim 3, wherein the cleaning ribbon is collected by the take-up reel in such a way that the width of the take-up reel is reduced.
13. A cleaning apparatus according to claim 12, wherein the width of the take-up reel is reduced by folding the cleaning ribbon at least once in a lengthwise direction.
14. A cleaning apparatus according to claim 3, wherein the cleaning ribbon is wound on the supply reel in such a way that the width of the supply reel is reduced and the cleaning ribbon is collected by the take-up reel in such a way that the width of the take-up reel is reduced.
15. A cleaning apparatus according to claim 3, wherein the supply and take-up reels are mechanically driven.
16. A cleaning apparatus according to claim 15, wherein the supply and take-up reels are driven at a rate different than the rate at which the cleaning apparatus is advanced along the surface to be cleaned.
17. A cleaning apparatus according to claim 3, wherein the rotatable brush comprises a plurality of bristles
18. A cleaning apparatus according to claim 3, wherein the rotatable brush comprises a plurality of flexible blades.
19. A cleaning apparatus according to claim 3, wherein the rotatable brush is mechanically driven.
20. A cleaning apparatus according to claim 19, wherein the rotatable brush is always driven in the same rotational direction, regardless of the direction of travel of the cleaning apparatus.

21. A cleaning apparatus according to claim 19, further comprising a plurality of rotatable wheels for advancing the cleaning apparatus along the surface to be cleaned, wherein the rotatable brush has a common axis with at least one of the plurality of rotatable wheels.
22. A cleaning apparatus according to claim 19, wherein the rotatable brush is driven at a rate different than the rate at which the cleaning apparatus is advanced along the surface to be cleaned.
23. A cleaning apparatus according to claim 22, further comprising a plurality of wheels for advancing the cleaning apparatus along the surface to be cleaned and a belt and pulley system for rotating the rotatable brush, wherein the belt and pulley system utilizes the rotation of at least one of the plurality of wheels to rotate the rotatable brush.
24. A cleaning apparatus according to claim 22, further comprising a plurality of wheels for advancing the cleaning apparatus along the surface to be cleaned and a plurality of gears for rotating the rotatable brush, wherein the plurality of gears utilizes the rotation of at least one of the plurality of wheels to rotate the rotatable brush.
25. A cleaning apparatus according to claim 3, further comprising a vacuum unit for supplying a suction within the housing.
26. A cleaning apparatus according to claim 25, wherein the suction within the housing removes debris from the particle trap.
27. A cleaning apparatus according to claim 25, wherein the suction within the housing is applied to the portion of the cleaning ribbon that creates the cleaning surface on a side of the cleaning ribbon opposite the surface to be cleaned.
28. A cleaning apparatus according to claim 25, wherein the suction within the housing is applied to the portion of the cleaning ribbon forming the particle trap on a side of the cleaning ribbon opposite that side of the cleaning ribbon collecting foreign particles.

29. A cleaning apparatus, comprising:

a housing;

means for advancing the housing along a surface to be cleaned;

a supply reel secured within the housing for dispensing a supply of cleaning ribbon;

a take-up reel secured within the housing for collecting spent cleaning ribbon;

means within the housing for keeping a portion of the cleaning ribbon which extends between the supply reel and the take-up reel substantially parallel to the surface to be cleaned;

means within the housing for trapping debris; and

means secured within the housing for sweeping debris into the debris trapping means.

30. A cleaning apparatus according to claim 29, wherein the advancing means comprises a handle attached to the housing.

31. A cleaning apparatus according to claim 29, wherein the advancing means is self-propelled.

32. A cleaning apparatus according to claim 29, wherein the advancing means is autonomous.

33. A cleaning apparatus according to claim 29, wherein the take-up reel collects the cleaning ribbon so that a side of the cleaning ribbon that was in substantial contact with the surface to be cleaned faces the take-up reel.

34. A cleaning apparatus according to claim 29, wherein the means for keeping the portion of the cleaning ribbon which extends between the supply reel and the take-up reel parallel to the surface to be cleaned comprises a guiding system.

35. A cleaning apparatus according to claim 34, wherein the guiding system prevents the cleaning ribbon from moving laterally relative to the housing.

36. A cleaning apparatus according to claim 34, wherein the guiding system comprises a platen.

37. A cleaning apparatus according to claim 36, further comprising means for movably mounting the platen with respect to the housing.

38. A cleaning apparatus according to claim 37, wherein the means for movably mounting the platen with respect to the housing comprises a linkage device.

39. A cleaning apparatus according to claim 37, further comprising a manual lever for operating the linkage device.

40. A cleaning apparatus according to claim 37, wherein the means for movably mounting the platen with respect to the housing comprises a motor.

41. A cleaning apparatus according to claim 37, further comprising a sensing means for that the platen must be moved with respect to the housing.

42. A cleaning apparatus according to claim 34, wherein the guiding system comprises a plurality of rollers.

43. A cleaning apparatus according to claim 34, wherein the guiding system configures the cleaning ribbon such as to wrap the cleaning ribbon over a forward portion of the platen,

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thereby directing the ribbon rearwardly over the portion of the cleaning ribbon which extends between the supply reel and the take-up reel parallel to the surface to be cleaned.

44. A cleaning apparatus according to claim 42, wherein the forward portion of the platen comprises an angled member.

45. A cleaning apparatus according to claim 29, wherein the means for sweeping debris into the debris trapping means comprises a rotatable brush disposed on the forward side of the debris trapping means.

46. A cleaning apparatus according to claim 29, wherein the means for sweeping debris into the debris trapping means is comprised of a plurality of rotatable brushes disposed on the forward side of the debris trapping means.

47. A cleaning apparatus according to claim 29, further comprising a mechanical drive system for advancing the cleaning ribbon.

48. A cleaning apparatus according to claim 47, wherein the mechanical drive system comprises a ribbon advancing reel coupled directly to the take-up reel.

49. A cleaning apparatus according to claim 47, wherein the mechanical drive system comprises a foot-pedal operated ratchet mechanism.

50. A cleaning apparatus according to claim 47, wherein the mechanical drive system controls the rate of advancement of the cleaning ribbon relative to the rate at which the housing is advanced along the surface to be cleaned.

51. A cleaning apparatus according to claim 50, further comprising a plurality of wheels for advancing the cleaning apparatus along the surface to be cleaned, wherein the mechanical drive system comprises a belt and pulley system which utilizes the rotation of at least one of the plurality of wheels to advance the take-up reel.

52. A cleaning apparatus according to claim 50, further comprising a plurality of wheels for advancing the cleaning apparatus along the surface to be cleaned, wherein the mechanical drive system comprises a plurality of gears which utilizes the rotation of at least one of the plurality of wheels to advance the take-up reel.

53. A cleaning apparatus according to claim 29, further comprising a motor for advancing the take-up reel.

54. A cleaning apparatus according to claim 29, further comprising a vacuum unit for supplying a suction within the housing.

55. A cleaning apparatus according to claim 54, wherein the suction within the housing removes debris from the particle trap.

56. A cleaning apparatus according to claim 54, wherein the suction within the housing is applied to the portion of the cleaning ribbon which extends between the supply reel and the take-up reel and substantially parallel to the surface to be cleaned on a side of the cleaning ribbon opposite the surface to be cleaned.

57. A cleaning apparatus according to claim 54, wherein the suction within the housing is applied to the portion of the cleaning ribbon that forms the particle trap on a side opposite the side of the cleaning ribbon that collects debris.

58. A cartridge for detachable securement within a cleaning apparatus, the cartridge comprising:

a supply reel;

a take-up reel;

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a cleaning ribbon extending between the supply reel and the take-up reel, the cleaning ribbon being configured so as to form a particle trap;

means for sweeping debris into the particle trap; and

means for detachably securing the cartridge to the cleaning apparatus.

59. A cartridge according to claim 58, wherein the cleaning ribbon is configured to form a particle trap.

60. A cartridge according to claim 58, wherein the sweeping means comprises a rotatable brush.

61. A cartridge according to claim 58, wherein the sweeping means comprises a plurality of rotating brushes.

62. A cartridge according to claim 58, wherein the securing means consists of at least one aperture within the cartridge for mating with at least one protrusion within the cleaning apparatus.

63. A cartridge according to claim 62, wherein the at least one aperture rotates freely about the at least one protrusion.

64. A cartridge according to claim 62, wherein the at least one aperture rotates in unison with the at least one protrusion.

65. A cartridge according to claim 58, wherein the cleaning ribbon is wound on the supply reel for reducing the width of the supply reel.

66. A cartridge according to claim 58, wherein the cleaning ribbon is collected by the take-up reel for reducing the width of the take-up reel.

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67. A cartridge for detachable securement within a cleaning apparatus, the cartridge comprising:

a supply reel;

a take-up reel;

a cleaning ribbon extending between the supply reel and the take-up reel, wherein the cleaning ribbon is configured to create a particle trap; and

means for detachably securing the cartridge to the cleaning apparatus.

68. A cartridge according to claim 67, wherein the securing means comprises at least one aperture within the cartridge for mating with at least one protrusion within the cleaning apparatus.

69. A cartridge according to claim 68, wherein the at least one aperture rotates freely about the at least one protrusion.

70. A cartridge according to claim 68, wherein the at least one aperture rotates in unison with the at least one protrusion.

71. A cleaning apparatus according to claim 65, wherein the cleaning ribbon is wound on the supply reel for reducing the width of the supply reel.

72. A cleaning apparatus according to claim 67, wherein the cleaning ribbon is collected by the take-up reel for reducing the width of the take-up reel.

73. A cleaning apparatus according to claim 67, wherein the cleaning ribbon is wound on the supply reel for reducing the width of the supply reel, and the cleaning ribbon is collected by the take-up reel for reducing the width of the take-up reel.